Technical white paper

VMware vSphere and HP ProLiant servers

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Introduction

We provide technology that lets you virtualize servers, storage, and networking. VMware® vSphere is a key part of our total virtualization solution. Our integration with vSphere gives you tools to develop cloud infrastructures and manage related applications and services.

VMware vSphere is based on VMware ESXi, a hypervisor that enables virtual machines to run on server hardware.

We are continually working with VMware to develop products that align server and virtualization technologies, so we can offer a portfolio of VMware products that simplify virtualization. HP OneView for VMware vCenter is an example of this collaborative effort. HP OneView for VMware vCenter is a plug-in to vCenter that integrates with vSphere and lets you deploy and manage the HP hardware that runs it. We also provide a variety of custom VMware vSphere components to help you manage and update your HP ProLiant servers running VMware vSphere. To simplify deployment, we provide a custom image that contains all of our management elements and the required drivers to support our servers.

HP OneView for VMware vCenter runs on any Windows® platform supported by HP Systems Insight Manager (HP SIM) 5.3.1 or greater.

This technology brief provides an overview of our integration with VMware vSphere for HP ProLiant servers and infrastructure. It explains what we are doing to make HP ProLiant servers and infrastructure easier to deploy and manage and how we enhance and enable new VMware vSphere capabilities.

HP custom components and VMware integration

New integrated management features in VMware vSphere increase flexibility and give you greater control over your systems:

- HP CIM Providers (also called HP Insight Management WBEM Providers) monitor, manage, and update HP ProLiant servers running VMware vSphere.
- HP OneView for VMware vCenter lets you monitor and manage your ProLiant-based virtualization environment.
- HP Online Depot repository provides the HP components to use when deploying and updating your HP ProLiant servers infrastructure.
- HP OneView for VMware vCenter or HP System Update Manager (HP SUM) lets you initiate ProLiant system firmware updates while VMware vSphere is running.
- VMware vSphere Auto Deploy lets you perform stateless deployments of VMware vSphere with all HP-specific components and recommended drivers.
- New Command Line Interface (ESXCLI) extensions let you:
  - Control boot devices
  - Manage HP Integrated Lights-Out (iLO) configuration and users
  - Perform server hardware configuration capture, set and duplication
  - Manage array controllers and physical and logical drives
  - Generate test indications and SNMP traps from the HP CIM Providers Manage server hardware configuration

WBEM provider integration and HP CIM Providers

Through our work with VMware, we were able to integrate HP CIM Providers with vSphere. The HP CIM Providers let you monitor, manage, and update HP ProLiant servers running vSphere. You can access the information from the providers using HP OneView for vCenter, HP System Insight Manager (HP SIM), or any client that supports WBEM. Starting with HP SIM 7.0, embedded agents along with HP Agentless Management (HP AMS) provide the default management software option installed on HP ProLiant Gen8 servers from HP Service Pack for ProLiant. This component collects information from the operating system and provides host-specific data to the HP iLO firmware.

The HP CIM Providers give you inventory and status information for servers, infrastructure, storage, and networks. HP CIM Providers monitor the hardware and generate WBEM indications for any discovered issues. The WBEM indications identify the specific component and server reporting the error, along with detailed information about the issue and recommended actions.

HP CIM Providers include support for the HP SIM "follow-the-red" capability. "Follow-the-red" lets you follow status values to locate issues. For example, you can observe the overall status of the server, and then drill down from servers to subsystems to individual components (such as fans, power supplies, NICs, or disks).

The HP CIM Providers support conversion of WBEM indications to HP SNMP traps, and send traps in addition to indications. The HP SNMP Management Information Bases (MIBs) define the HP SNMP traps that HP CIM Providers generate. The SNMP Data Migration Guide (hp.com/go/vmware/proliant-docs) documents the new WBEM class or indication and its equivalent OID or trap in SNMP. The HP CIM Providers for vSphere include all the same health and management capabilities as HP providers on other ProLiant platforms.

You can use the HP Custom Image (available in the HP Online Depot) or the HP ESXi Offline Bundle for VMware vSphere to obtain pre-integrated or installable HP CIM Providers.

The HP Online Depot is available at vibsdepot.hp.com.

HP ESXi Offline Bundle for VMware vSphere available at hp.com/go/esxidownload.

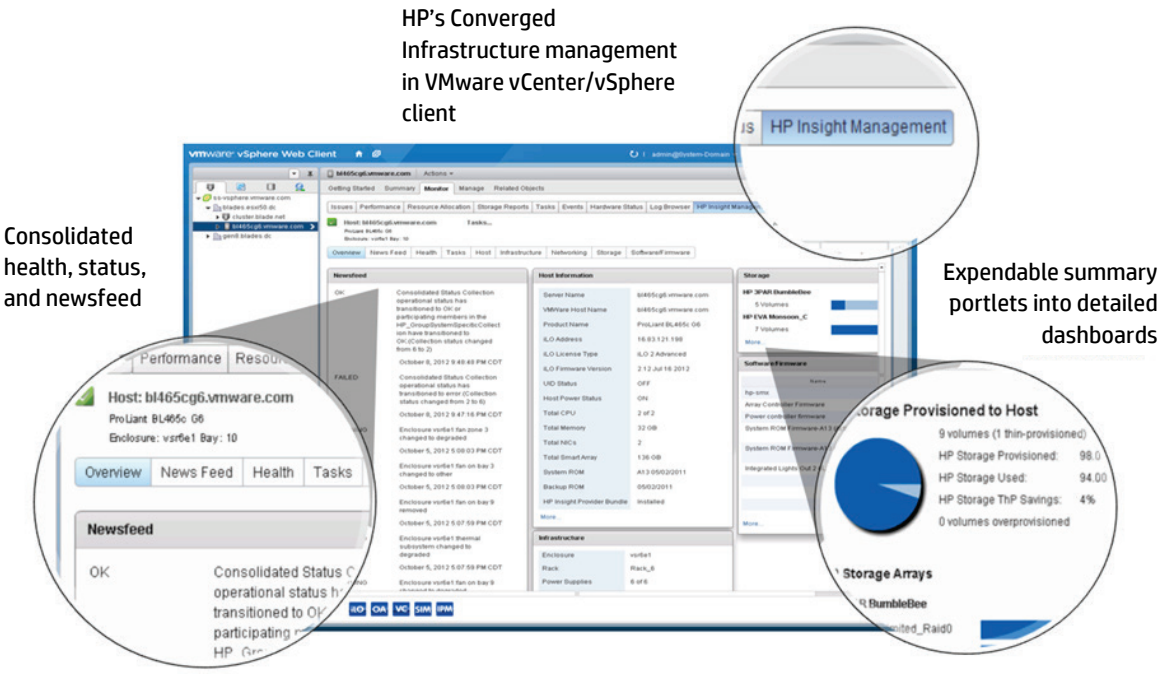
HP OneView for VMware vCenter

We are the first partner to integrate both physical and virtual management into VMware vCenter Server. As a vCenter Server plug-in, HP OneView for VMware vCenter helps you manage multiple generations of HP ProLiant servers. HP OneView for VMware vCenter leverages the industry's leading management tools from HP OneView, which allow you to monitor your entire network. From the vCenter console, you can manage your virtualization environment, including server, storage, and network infrastructure.

HP OneView for VMware vCenter compiles host-level information such as component status and power data from HP iLO, HP Onboard Administrator, HP SNMP agents, HP CIM Providers, and Virtual Connect Manager. HP OneView for VMware vCenter displays the information on the HP Insight Software tab in the vSphere client. This tab has the same look, feel, and navigation behavior as other vSphere client tabs. HP OneView for VMware vCenter interfaces directly with HP CIM Providers and SNMP agents, providing information and alerts to help you manage your servers.

See figure 1 for an example of the HP OneView for VMware vCenter system status window that lets you view current server status and power settings. It includes links to various system applications.

Figure 1. This figure shows an example of the HP OneView for VMware vCenter system status window



HP OneView for VMware vCenter offers support for firmware updates. You can update system firmware and export information about component firmware status for servers running VMware vSphere 5 and newer.

HP Online Depot

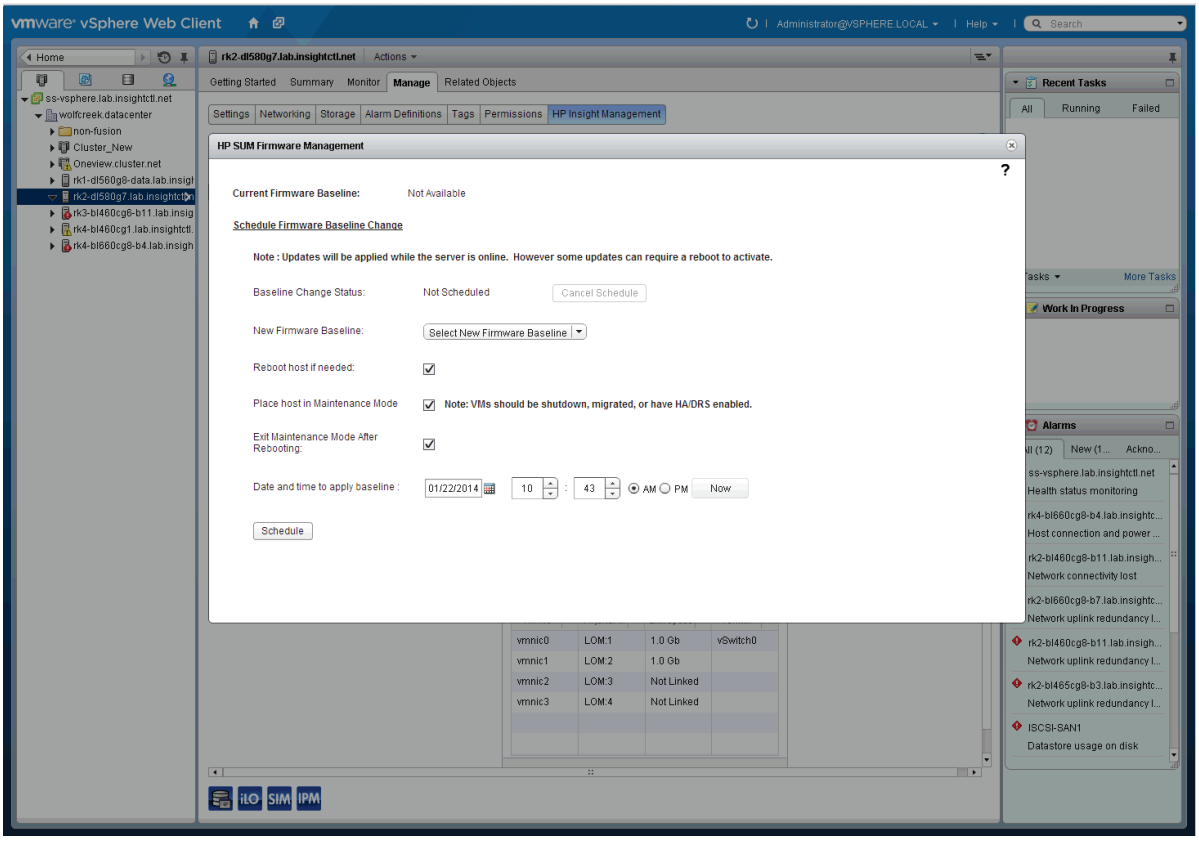
The HP Online Depot is our Web-based repository for bundles of HP-specific components for VMware vSphere. The bundles provide important solutions for the management and configuration of HP ProLiant servers. You can use these bundles with VMware vSphere Image Builder, VMware Update Manager (VUM), and VMware vSphere CLI (ESXCLI) to create custom images, Auto Deploy image profiles, or update existing systems. The HP Online Depot is available at vibsdepot.hp.com.

The HP Online Depot also contains links to technical and support documentation, the HP Custom Image, and the HP Custom image profile depot.zip.

Firmware updates

For firmware updates, you can initiate firmware updates from HP OneView for VMware vCenter or HP SUM. Figure 2 shows the HP OneView for VMware vCenter firmware update window.

Figure 2. This is the window for the HP OneView for VMware vCenter firmware update



HP SUM supports multiple hosts and helps you perform either scripted or interactive server firmware deployments. HP SUM does not install an agent on the server and does not require special installation on the client workstation that performs the updates.

The firmware update process uses HP SUM or HP OneView with VMware vSphere 5 and newer and applies an SPP; this process is coordinated by putting the host in maintenance mode and is schedulable. You can also determine the status of component firmware using HP OneView for VMware vCenter. The same tool you use to update ProLiant system firmware also lets you update VMware vSphere.

VMware vSphere Auto Deploy

VMware vSphere includes VMware vSphere Auto Deploy, which lets you provision and configure one or more physical hosts.

Using Auto Deploy to provision your HP ProLiant servers requires the use of image profiles and host profiles. The image profile defines the VMware vSphere image that loads into system RAM each time the server boots and optionally configures a host with a host profile. We provide Auto Deploy-ready VMware Installation Bundles (VIBs) that you can use to add HP-specific components to your image profile. These VIBs are available in the HP Online Depot at vibsdepot.hp.com.

Image profile. Image profiles define the set of VIBs to load at boot time, such as the base image, additional drivers, HP components, and other third-party components. The HP Custom image profile that includes everything included in the HP Custom Image is available from hp.com/go/esxidownload.

Using Auto Deploy, you can identify hosts to provision with a particular image profile. When you include the HP-specific components and recommended drivers in the image profile, you end up with a fully-managed HP server operating in stateless mode.

Host profile. Host profiles contain a host configuration for networking, storage, and security, plus other settings information. Host profiles help you manage your ProLiant host configurations by eliminating per-host, manual, or UI-based host configuration. Host profile policies help you maintain configuration consistency across the data center. You can create host profiles using a known, validated reference host configuration. You can also check a host or cluster against a host profile for any deviations.

You can install the tools required to use Auto Deploy on the same server as vCenter. The Linux®-based vCenter appliance also includes these tools.

For more information about using Auto Deploy, see the vSphere Installation and Setup guide at vmware.com/vsphere-50/topic/com.vmware.ICbase/PDF/vsphere-esxi-vcenter-server-50-installation-setup-guide.pdf.

HP VMware ESXCLI utilities

We have ESXCLI and command line utilities to aid in configuration and management of HP ProLiant servers. These utilities are available in the HP ESXi Utilities Offline Bundle for VMware vSphere available at hp.com/go/esxidownload.

Setting the boot order

The hpbootcfg boot configuration utility lets you set the boot order for the next system reboot while VMware vSphere is running.

iLO configuration

The **hponconfig** iLO configuration utility lets you gather and set iLO configuration information while VMware vSphere is running.

Array configuration

The hpssacli Smart Array configuration utility lets you display Smart Array controller, logical volume, and physical drive inventory, configuration information, and array diagnostic information. This utility also lets you configure logical volumes while VMware vSphere is running.

System hardware configuration

The conrep utility lets you gather and set system hardware configuration while VMware vSphere is running for activation at the next boot.

Test event generation

The hptestevent utility lets you generate test WBEM indications and SNMP traps from the HP CIM Providers.

Additional configurations

We also integrated the following components into the vSphere 5 release:

- Non-Maskable Interrupt (NMI) event reporting is available in the Integrated Management Log (IML) to keep you aware of physical hardware events.
  - HP Smart Array integration provides information about Smart Array to vCenter Server.

Why use HP platforms to run VMware vSphere?

We strive to make HP ProLiant servers the best options for running VMware vSphere. HP ProLiant servers offer extensive integrated management capabilities for your VMware environment. We offer over 100 different certified and tested server platforms for use with VMware vSphere, more than any other vendor does. Below are just two examples of ProLiant Gen8 technology featuring HP Proactive technology that, along with vSphere, allow you to virtualize large, complex workloads:

- The HP ProLiant BL660c Gen8 Server is an x86 blade offering 4P performance in a single-wide, full-height form factor. The BL660c Gen8 server offer double the computing density compared to previous 4P blades, allow you to repurpose valuable enclosure space and further reduce data center sprawl.
- The HP ProLiant DL560 Gen8 server is a density-optimized 4-socket rack-mount server designed to deliver performance and scalability. Featuring HP ProActive Insight Architecture, the DL560 Gen8 server is ideal for environments that involve virtualization, database management, and business processing.

For additional certification and server support information, see the VMware from HP ProLiant Server VMware Support Matrix at hp.com/go/ossupport.

What we've done to integrate components

We design servers to address customer performance requirements and application needs. Our Balanced System Architecture aligns memory, I/O, storage, and processing power to maximize performance and optimize subsystems. This is important because if your architecture is not balanced, bottlenecks can develop. To rebalance the subsystems, you have to monitor and adjust your memory bandwidth, I/O bandwidth, and CPU processing.

VMware vSphere support of balanced architecture lets us increase support of virtual and physical hosts. This maximizes the number of virtual machines a server can run, resulting in increased virtual machine capacity.

The integration of Virtual Connect within BladeSystem platforms also helps improve performance. If you use Virtual Connect, you can keep I/O traffic (virtual machine to virtual machine) inside the enclosure. This improves performance and reliability by using mostly cable-free internal chassis connections between hosts and management services.

Integrating HP OneView with vCenter enables comprehensive deployment, provisioning, monitoring, remote control, and power optimization for both virtual and physical environments.

Conclusion

VMware products from HP provide comprehensive hardware, software, and services solutions for your virtualized environment. We offer full support for VMware vSphere within the ProLiant infrastructure; while our custom components help you manage and update your HP ProLiant servers running the ESXi hypervisor. Tight integration of VMware virtualization within our hardware and software platforms helps maintain a consistent and reliable ProLiant management environment.

Resources

HP Virtualization with VMware
hp.com/go/vmware

HP Online Depot
vibsdepot.hp.com

HP Enterprise Information Library HP ProLiant with VMware vSphere
hp.com/go/vmware/proliant-docs

VMware vSphere from HP
hp.com/products/servers/software/vmware/?jumpid=reg_R1002_USEN

VMware Resource Library (white papers, data sheets, etc.)
hp.com/v2/erl.aspx?&query=yes&keywords=vmware%20vsphere&logic=AND&docreq=ww|en&doctype=all&numberitems=10

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